

The University of the State of New York

329TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, January 22, 1957 — 9:15 a.m. to 12:15 p.m., only

Instructions

Part I is to be done first and the maximum time allowed for it is one and one half hours. At the end of that time, this part of the examination must be detached and will be collected by the teacher. If you finish part I before the signal to stop is given, you may begin part II.

Write at top of first page of answer paper to parts II and III (a) name of school where you have studied, (b) number of weeks and recitations a week in intermediate algebra.

The minimum time requirement is four or five recitations a week for half a school year after the completion of elementary algebra.

Fill in the following lines:

Name of pupil.....Name of school.....

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed.

- 1 Write the binomial whose factors are: $a, x - 1, x + 1$. 1.....
- 2 Express the sum of $\sqrt{-8}$ and $i\sqrt{2}$ as a monomial in terms of i . 2.....
- 3 Write the fraction $\frac{2}{3 - \sqrt{2}}$ as an equivalent fraction with a rational denominator. 3.....
- 4 Combine into a single fraction: $\frac{3}{x - 1} - \frac{1}{x}$ 4.....
- 5 Find the value of $64^{\frac{2}{3}} \times 2^{-1} - 4^0$. 5.....
- 6 What value of x satisfies the equation $\sqrt{3x - 2} - 4 = 0$? 6.....
- 7 Solve the following system of equations for x :
 $4x + y = 5$
 $2x + y = 9$ 7.....
- 8 Solve for n : $P = T(n - 2)$ 8.....
- 9 If d varies directly as the square of t and if $d = 12$ when $t = 2$, find the value of d when $t = 5$. 9.....
- 10 Write in *simplest form* the third term in the expansion of $(1 + 2y)^n$. 10.....
- 11 In triangle ABC , angle $C = 90^\circ$, side $AB = 10$ and side $BC = 7$. Find angle A to the *nearest degree*. 11.....
- 12 Find the logarithm of 7634. 12.....

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- 13 If $\log n = 8.2916 - 10$, find n . 13.....
- 14 If $\log x = a$, express $\log x^3$ in terms of a . 14.....
- 15 If the number 0.0000562 is written in the form 5.62×10^n , what is the value of n ? 15.....
- 16 Find the slope of the line represented by the equation $2x - 5y + 6 = 0$. 16.....
- 17 Write an equation which expresses the relationship between x and y as shown in the following table:

x	-1	0	1	2
y	-5	-2	1	4

- 17.....
- 18 What is the name of the graph whose equation is $x^2 - 4y^2 = 9$? 18.....
- 19 What three numbers can be inserted between 2 and 30 to form with these numbers an arithmetic progression of 5 terms? 19.....
- 20 When $a = 4$, $r = 3$ and $n = 4$, find the value of S in the formula $S = \frac{a(r^n - 1)}{r - 1}$. 20.....
- 21 The roots of the equation $x^2 + px + q = 0$ are 5 and -2 . Find the value of p . 21.....
- 22 Find the value of x at each of the two points at which the graph of $y = x^2 - 2x - 8$ crosses the x -axis. 22.....
- 23 If peanuts and cashew nuts are mixed in the ratio 1:3, respectively, how many pounds of peanuts are contained in n pounds of the mixture? 23.....

Directions (24-25): Indicate the correct completion for each of the following by writing on the line at the right the letter a , b , c or d .

- 24 The value of $(x^2)^8$ is equal to (a) x^5 (b) x^6 (c) x^8 (d) x^0 24.....
- 25 The roots of the equation $5x^2 - 2x + 2 = 0$ are (a) real, rational and equal (b) real, rational and unequal (c) real, irrational and unequal (d) imaginary 25.....

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Part II

Answer three questions from this part. Show all work.

- 26 Solve the following system of equations and check: [8, 2]

$$\begin{aligned}x^2 + y^2 - 3y &= 4 \\2x - y &= 1\end{aligned}$$

- 27 Find to the *nearest tenth* the roots of the equation $3x^2 - 8x + 2 = 0$. [10]

- 28 a Draw the graph of the equation $y = 2x^2 + 4x - 3$ from $x = -4$ to $x = 2$, inclusive. [6]

b Draw the axis of symmetry of the graph made in answer to part a. [1]

c From the graph made in answer to part a,

(1) find the coordinates of the minimum point of the graph [1]

(2) estimate to *tenths* the roots of the equation $2x^2 + 4x - 3 = 0$ [2]

- 29 Given the formula $d = \sqrt{\frac{6V}{e \cos x}}$

Using logarithms, find to the *nearest tenth* the value of d when $V = 248$, $e = 6.50$ and $x = 72^\circ$. [10]

The following questions, *30 and *31, are based upon optional topics in the syllabus, and one of them may be substituted for any one question in either part II or part III. Therefore one, but not both, of these questions may be included in the total of 5 required questions from parts II and III.

- *30 Solve the following system of equations and check: [8, 2]

$$\begin{aligned}3x - 2y - 3z &= -1 \\6x + y + 2z &= 7 \\9x + 3y + 4z &= 9\end{aligned}$$

- *31 Solve the equation $2x^3 - 3x^2 - 11x + 6 = 0$. [10]

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Part III

Answer two questions from this part. Show all work unless otherwise directed. Only algebraic solutions will be accepted in 33-35.

32 Write the equations that would be used to solve the following problems. In *each* case state what the letter or letters represent. [Solution of the equations is not required.]

a The product of the digits of a two-digit number is 8. The number is 4 times the sum of its digits. Find the number. [5]

b A motorist drove from *A* to *B* at an average rate of 40 miles per hour. He returned over a different route, which was 10 miles longer, at an average rate of 30 miles per hour. If his total traveling time was 5 hours, what was the distance from *A* to *B* by the shorter route? [5]

33 Dan takes 7 hours longer than Bill to complete a certain piece of work. Together they can complete the work in 12 hours. Find the time it takes Bill to do the work alone. [5, 5]

34 The sum of the first 14 terms of an arithmetic progression is 175, and the eighth term is 16. Find the *second* term of the progression. [6, 3, 1]

35 A boy expected to pay \$3.50 for a certain number of pounds of meat. Because the meat cost 5 cents per pound more than he expected, he bought one pound *less* than he had planned to buy and received 20 cents in change. How much did he pay per pound? [6, 4]

FOR TEACHERS ONLY

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INSTRUCTIONS FOR RATING INTERMEDIATE ALGEBRA

Tuesday, January 22, 1957 — 1:15 to 4:15 p.m., only

Use only *red* ink or pencil in rating Regents papers. Do not attempt to *correct* the pupil's work by making insertions or changes of any kind. Use check marks to indicate pupil errors.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. In problems involving logarithms, answers should be left correct to four significant digits unless directions say otherwise. Units need not be given when the wording of the questions allows such omissions.

Part I

Allow 2 credits for each correct answer; allow no partial credit. Do not allow credit if the answer to question 12 is not expressed to *four* decimal places and if the answer to question 13 is not expressed to *four significant digits*. For questions 24–25, allow credit if the pupil has written the correct answer instead of the letter *a*, *b*, *c* or *d*.

- | | |
|---|--------------------|
| (1) $ax^2 - a$ | (13) 0.01957 |
| (2) $3i\sqrt{2}$ | (14) $3a$ |
| (3) $\frac{6 + 2\sqrt{2}}{7}$ | (15) -5 |
| (4) $\frac{2x + 1}{x(x - 1)}$ | (16) $\frac{2}{3}$ |
| (5) 7 | (17) $y = 3x - 2$ |
| (6) 6 | (18) hyperbola |
| (7) -2 | (19) 9, 16, 23 |
| (8) $\frac{P}{T} + 2$ or $\frac{P + 2T}{T}$ | (20) 160 |
| (9) 75 | (21) -3 |
| (10) $60y^2$ | (22) 4, -2 |
| (11) 44 | (23) $\frac{n}{4}$ |
| (12) 3.8827 | (24) <i>b</i> |
| | (25) <i>d</i> |

